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Institutet**

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# Healthcare Associated Infections In Vascular Surgery

AKADEMISK AVHANDLING  
som för avläggande av medicine doktorsexamen vid Karolinska  
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## ABSTRACT

Health care associated infections (HCAI) affect roughly four million people in Europe annually, resulting in 16 million extra days of hospital stay, 37 000 attributable deaths and direct costs of approximately € 7 billion. HCAI in vascular surgery are relatively common complications with potentially devastating consequences. The aim of this thesis, based on four papers, was to study the scope of these complications and investigate the viability of methods for large-scale follow-up of patients after discharge and potentially more accurate laboratory diagnostic tools for postoperative infections.

*The first paper*, which is also the first of the two epidemiological studies included 10 547 patients who had undergone elective, infrainguinal revascularization – open or endovascular – during the period 2005-2010. Data were collected from the Swedish National Registry for Vascular Surgery (Swedvasc), the Swedish National Patient Register (NPR) and the Cause of Death Register. The total incidence of HCAI within 30 days was 9.7% (n = 1 019). The rate of 30-day HCAI for endovascular procedures was 7.8% (490/6 262) and for bypass operations 13.3% (430/3 224). The rate of major amputation at one-year was 11.8% (98/833) for patients with postoperative HCAI and 5.6% (446/7 933) for those without HCAI postoperatively.

*The second paper*, a prospective, clinical pilot-study, evaluated the effect of surgically induced inflammation on neutrophil CD64 receptors, which have been shown to undergo a rapid up-regulation in response to bacterial infection. This study included 153 elective, vascular patients. The results showed a non-significant effect of surgical trauma on CD64 receptors, as well as, a significant increase in CD64 expression postoperatively, in response to bacterial infection. *The third paper* aimed to investigate some of the cellular responses to surgical trauma and infection by measuring the changes in serum concentration of an array of cytokines in 96 consecutive patients undergoing non-emergent vascular surgery. The results showed a decrease in eight pro-inflammatory cytokines and a positive correlation between perioperative infection and the anti-inflammatory cytokines, interleukin (IL)-10 and IL-13.

*The fourth paper*, which included a similar cohort to the first paper, collected data on 9 894 patients from Swedvasc, NPR and the Prescribed Drug Register, between 2005 and 2010. The aim of this study was to determine the rate and type of postoperative HCAI, after discharge from hospital, using antibiotic prescription as a surrogate marker. We have shown that 33% of patients received an antibiotic prescription within 30 days of the index operation. In the endovascular group, there was a 52% increase in the rate of prescriptions postoperatively compared to the preoperative period. Prescriptions for urinary tract infections dominated the 30-day postoperative period for patients with claudication.

The rates of postoperative HCAI after lower limb revascularization warrant a more extensive follow-up regimen, including post-discharge, for both open and endovascular procedures. The need for more accurate laboratory tests in the early postoperative period still remains to be fulfilled. Neutrophil CD64 in combination with other markers, such as IL-10 and C-reactive protein have shown potential in this area and merit further investigation.